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919-362-2502

10 CFR 50.90

April 25, 2016  
Serial: HNP-16-029

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Shearon Harris Nuclear Power Plant, Unit 1  
Docket No. 50-400  
Renewed License No. NPF-63

**Subject:** Response to Request for Additional Information Regarding License Amendment  
Request for Main Steam Safety Valve Lift Setting Tolerance Change

Ladies and Gentlemen:

By letter dated December 17, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15362A169), Duke Energy Progress, Inc. (Duke Energy), requested a license amendment to the Technical Specifications (TS) for the Harris Nuclear Plant, Unit 1 (HNP) to revise the as-found lift setting tolerance for main steam line code safety valves (MSSVs) in TS 3.7.1.1, Table 3.7-2, from  $\pm 1\%$  to  $\pm 3\%$ . To support the MSSV setpoint tolerance change, changes are required to TS 2.2.1, Table 2.2-1. Specifically, the reactor trip system instrumentation trip setpoint for pressurizer water level-high percentage of the instrument span is reduced from 92% to 87%. Further, the allowable value of the instrument span is requested to be reduced from 93.5% to 88.5%. A change to reduce the maximum pressurizer water level limiting condition of operation from less than or equal to 92% of indicated span to less than or equal to 75% of indicated span, which requires a change to TS 3.4.3, is also proposed with this change.

The NRC staff reviewed the request and determined that additional information is needed to complete their review. Duke Energy received a request for additional information (RAI) from the NRC through electronic mail on March 30, 2016 (ML16091A006). A response to this request is required by April 28, 2016.

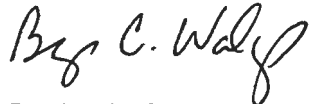
The Attachment to this letter provides Duke Energy's response to the RAI questions.

In accordance with 10 CFR 50.91(b), HNP is providing the state of North Carolina with a copy of this response.

Should you have any questions regarding this submittal, please contact John Caves, Manager – Regulatory Affairs, at (919) 362-2406.

I declare under penalty of perjury that the foregoing is true and correct. Executed on  
April 25, 2016.

Sincerely,

A handwritten signature in black ink, appearing to read "Ben C. Waldrep". The signature is fluid and cursive, with the first name "Ben" and last name "Waldrep" clearly distinguishable.

Benjamin C. Waldrep

Attachment:

Response to Request for Additional Information

cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP  
Mr. W. L. Cox, III, Section Chief, N.C. DHSR  
Ms. M. Barillas, NRC Project Manager, HNP  
NRC Regional Administrator, Region II

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U.S. Nuclear Regulatory Commission  
Serial HNP-16-029  
Attachment

**SERIAL HNP-16-029**

**ATTACHMENT**

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

**SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1**

**DOCKET NO. 50-400**

**RENEWED LICENSE NUMBER NPF-63**

By letter dated December 17, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15362A169), Duke Energy Progress, Inc. (Duke Energy), requested a license amendment to the Technical Specifications (TS) for the Harris Nuclear Plant, Unit 1 (HNP) to revise the as-found lift setting tolerance for main steam line code safety valves (MSSVs) in TS 3.7.1.1, Table 3.7-2, from  $\pm 1\%$  to  $\pm 3\%$ . To support the MSSV setpoint tolerance change, changes are required to TS 2.2.1, Table 2.2-1. Specifically, the reactor trip system instrumentation trip setpoint for pressurizer water level-high percentage of the instrument span is reduced from 92% to 87%. Further, the allowable value of the instrument span is requested to be reduced from 93.5% to 88.5%. A change to reduce the maximum pressurizer water level limiting condition of operation from less than or equal to 92% of indicated span to less than or equal to 75% of indicated span, which requires a change to TS 3.4.3, is also proposed with this change. The NRC staff reviewed the request and determined that additional information is needed to complete their review. Duke Energy received a request for additional information (RAI) from the NRC through electronic mail on March 30, 2016 (ML16091A006). A response to this request is required by April 28, 2016.

**RAI-1:**

Table 2 of the LAR [License Amendment Request] provides a summary of the FSAR [Final Safety Analysis Report], Chapter 15 event dispositions related to the increased setpoint tolerance change. The results presented in this table are based on AREVA Document No.: 51-9237347-002, "Harris PSV [Pressurizer Safety Valve] and MSSV Tolerance Increase Disposition of Non-LOCA Events." This document, which was reviewed during the March 2016 audit, contains the following statement for numerous events:

"This disposition will require further verification (See Assumption #1 in Section 4.0) by Duke to confirm that the revised Turbine Trip analysis continues to bound the (VARIOUS EVENTS)."

Please confirm that DEP [Duke Energy Progress, Inc.] has performed the verification that the revised turbine trip analysis continues to bound the individual events listed in Table 2 of the LAR.

**HNP Response:**

The subject verification statement from AREVA Document No. 51-9237347-002 is made for the following FSAR events:

- a) Loss of External Electrical Load (FSAR Section 15.2.2)
- b) Inadvertent Closure of the Main Steam Isolation Valves (FSAR Section 15.2.4)
- c) Loss of Condenser Vacuum and Other Events Resulting in Turbine Trip (FSAR Section 15.2.5)
- d) Loss of Non-Emergency AC [Alternating Current] Power to the Station Auxiliaries (FSAR Section 15.2.6)
- e) Loss of Normal Feedwater Flow (FSAR Section 15.2.7)
- f) Feedwater System Pipe Break (FSAR Section 15.2.8)

All of these events are categorized in the HNP FSAR as events that experience a decrease in heat removal by the secondary system. Within the current set of analyses for this category of event, the most limiting primary and secondary system overpressurization occurs for the turbine

trip event (FSAR Section 15.2.3). The turbine trip event experiences the fastest and most complete loss of secondary side heat removal for the events listed in FSAR Section 15.2. The turbine trip event causes a rapid pressure excursion on both primary and secondary systems such that system pressures temporarily overshoot the safety valve lift setpoints. As described in the HNP FSAR, the loss of electrical load (FSAR Section 15.2.2), inadvertent closure of the main steam isolation valves (FSAR Section 15.2.4), and loss of condenser vacuum and other events resulting in a turbine trip (FSAR Section 15.2.5) are similar to the turbine trip event, but are less limiting since the initiating events isolate the secondary side from the turbine heat sink at a slower rate. For events analyzed in FSAR Sections 15.2.6, 15.2.7, and 15.2.8, the loss of secondary side heat removal is less dynamic, leading to a slower primary and secondary system pressure excursion. For these events, system pressures do not exceed safety valve lift setpoints. The requested changes to the MSSV lift setpoint tolerance will not invalidate these conclusions in the HNP FSAR.

As discussed in Section 3.3.3 of Enclosure 1 to the LAR, the primary and secondary system overpressure results for the revised turbine trip analysis are similar to or bound the values from the previous FSAR Section 15.2.3 turbine trip overpressure analysis of record (AOR). As a result, the revised FSAR Section 15.2.3 turbine trip overpressure results continue to bound the overpressurization results for other American Nuclear Society (ANS) Condition II, III, and IV events including, but not limited to, the FSAR events listed above. Therefore, since all limiting event determinations previously described in the HNP FSAR remain valid, Duke Energy has verified that the revised turbine trip analysis continues to bound the individual events listed in Table 2 of the LAR.

**RAI-2:**

Please explain the reason for the change in the Pressure Safety Valve setpoint uncertainty in the Turbine Trip analysis and its impact on the calculation results.

**HNP Response:**

The nominal opening setpoint for the pressurizer safety valves (PSVs) is 2485 pounds per square inch gauge (psig) with an uncertainty of  $\pm 1\%$ , as described by HNP TS 3.4.2. The original intent of the LAR was to include a request to change the PSV setpoint tolerance from  $\pm 1\%$  to  $\pm 3\%$ . However, the request to change the PSV setpoint tolerance is not part of this LAR.

As described in the LAR, Duke Energy performed a new analysis for the overpressure evaluation of the FSAR Section 15.2.3 turbine trip event. This new analysis models the PSV opening setpoint assuming an uncertainty of  $+3\%$ , which reflects the original intent of the LAR. With this assumption, the PSVs open at 2560 psig ( $2485 \text{ psig} \times 1.03$ ) compared to 2510 psig ( $2485 \text{ psig} \times 1.01$ ). Modeling the PSV opening setpoint assuming an uncertainty of  $+1\%$  or  $+3\%$  has no effect on the peak secondary pressure calculation because the peak pressurizer pressure remains below 2485 psig. Increasing the opening setpoint of the PSVs delays the opening of the PSVs, which yields a more limiting result for the peak primary pressure evaluation.

**RAI-3:**

Please explain how the “Dispositions” in the Table 2 of the LAR (Summary of FSAR Chapter 15 Event Dispositions) are developed.

**HNP Response:**

The dispositions of the HNP FSAR accident analyses summarized in Table 2 of the LAR are divided into the categories identified below. The disposition of some FSAR events fall into multiple categories to cover the various aspects of the analysis (for example, FSAR Section 15.3.3 Reactor Coolant Pump Shaft Seizure performs multiple cases to cover acceptance criteria for both Departure from Nucleate Boiling and Reactor Coolant System overpressure).

1. FSAR events that do not involve a Nuclear Steam Supply System (NSSS) transient: There is no impact to these evaluations as the components and systems affected by the requested changes are not considered in the evaluation. The applicable FSAR Sections in Table 2 are as follows: Sections 15.4.7, 15.6.2, 15.7.1, 15.7.2, 15.7.3, 15.7.4, and 15.7.5.
2. Events where an FSAR evaluation dispositions the event against a more limiting FSAR event: As discussed in Duke Energy’s response to RAI-1 and in Section 3.4 of Enclosure 1 to the LAR, Duke Energy has confirmed that all limiting event determinations previously described in the HNP FSAR remain valid with the revised FSAR Section 15.2.3 turbine trip analysis. Therefore, these events continue to be bounded by a more limiting event and there is no additional impact from the requested changes. The applicable FSAR Sections in Table 2 are as follows: Sections 15.1.1, 15.1.4, 15.2.2, 15.2.4, 15.2.5, 15.2.6, 15.2.7, 15.3.1, 15.3.4, 15.4.4, 15.4.6, and 15.5.2.
3. FSAR events where the components and systems affected by the requested changes are not exercised in the AOR: For these events, the analyzed transient response is such that the MSSV lift setpoint and/or the high pressurizer level reactor trip setpoint are not challenged. Therefore, the requested changes do not affect the AOR and the AOR continues to bound the requested plant configuration. The applicable FSAR Sections in Table 2 are as follows: Sections 15.1.2, 15.1.3, 15.1.5, 15.3.2, 15.3.3, 15.4.1, 15.4.2, 15.4.3.1, 15.4.3.2, 15.4.3.3, 15.4.8, 15.5.1, and 15.6.1.
4. FSAR events where the primary and/or secondary system pressure response in the AOR is affected by the requested changes, but the overpressure results are bounded by the revised FSAR Section 15.2.3 turbine trip analysis: Since the revised turbine trip analysis meets the more restrictive ANS II acceptance criteria, affected AORs of the ANS III and IV variety will inherently satisfy their associated acceptance criteria regarding primary and secondary overpressure. The applicable FSAR Sections in Table 2 are as follows: Sections 15.2.6, 15.2.7, 15.2.8, 15.3.3, 15.4.2, and 15.4.3.2.
5. FSAR events where additional discussion or evaluation is required to investigate the impact of the requested changes: With the exception of two FSAR events, this category of disposition in Table 2 of the LAR points to specific sections in Enclosure 1 to provide the additional details necessary to disposition the impact for the requested changes. For FSAR Sections 15.2.7 and 15.6.1, the results of the disposition evaluation are succinctly summarized within Table 2 of the LAR. The applicable FSAR Sections in Table 2 are as follows: Sections 15.2.3, 15.2.7, 15.6.1, 15.6.3, 15.6.5, 15.8, Radiological Consequences, Control Room Habitability, and Alternate Source Term.